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Clinical and Histocytological Correlation of Breast Lesions

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Abstract
Background: *To study the clinical and histocytological correlation of breast lesions. In India, breast cancer is the second most common cancer after the cervical cancer.*
Methods: *In this retrospective study, total 300 cases of breast lesions over a period of one and half year in our institute of Pathology Department of G.R. Medical College, Gwalior from January 2018 to June 2019 were studied. All patients who had FNAC of breast lumps with subsequent histological confirmation were included in the study.*
Results: *In the study, a total of 300 cases were analysed whose clinical, cytological and histological data available. The aspirates were obtained from 297 (99%) females and 3 (1%)males. The sensitivity of FNAC in determining the final histologic diagnosis was found to be 97.1% while the specificity was 100%.*
Conclusions: *FNAC is a reliable diagnostic tool of breast lesions in our centre. We concluded that neoplastic lesions were more common than non-neoplastic lesions. It is simple, safe and cost effective outpatient procedure associated with negligible complications.*
Keywords: *Breast lesions, Fine needle aspiration cytology, Neoplastic,Non-neoplastic, Histopathology.*

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I. Introduction

In India, breast cancer is the second most common cancer after the cervical cancer. Incidence of breast diseases are rising worldwide[1] which is due to increasing public awareness about the breast cancer. Presently the breast cancer is most common female malignancy globally.[2]

Breast cancer incidence is very high in developed countries compared to incidence in developing countries[3].In India, population based registries of urban areas indicates that the incidence of breast cancer seen ranges from 20-30 per 1, 00,000 person[4].Identification of different benign and malignant breast lesions is important for the management of these patients. The diagnostic process involves the "Triple Test" consisting of clinical examination, mammography and FNAC.[5]

FNAC was described and practiced by the Martin and Ellis in 1930.[6]FNAC is a very important tool in the assessment of various breast lesions.[7]

The advantages of this procedure lies in the fact that it is simple to perform, cost-effective, rapidly accepted by the patient, and cosmetically least disfiguring.It is a valuable tool in diagnosis and management of breast lesions. It has high diagnostic accuracy.[8,9] This helps clinician in planning the correct surgical or medical treatment.[10,11]

It is a safe and easy OPD procedure which needs no hospitalization, and can be repeated easily if needed. The result can be available on the same day and it may obviate need for the open biopsy[9] but in few cases final and definitive diagnosis will be made on the basis of histopathological examination.[6]
The aim of this study is to correlate FNAC and histopathological diagnosis of the various breast lesions.

II. Material And Methods

The study was conducted on 300cases at GRMC Gwalior, in the department of Pathology for a period of 18months from January 2018 to June 2019. All breast lesion patients were clinically examined and their detailed history and radiological findings were recorded.

Informed consent was taken from the patient. FNAC was performed on 300cases that came with history of breast lump. Detailed history was taken, followed by clinical examination. Then FNAC procedure was explained to the patient.

Overlying skin was cleaned with antiseptic. Lump was identified and firmly held between the thumb and forefinger of free hand. A 20ml syringe with 24 gauze needle held outside the barrel and the needle tip was pushed into the lesion. As needle entered the mass, a change in consistency was felt. The plunger was kept partially retracted creating a negative pressure and without losing the pressure or pulling the needle tip out of the

skin, entire syringe was rotated by a movement at wrist, and needle was moved back and forth into the mass, in different directions keeping needle inside the mass.

Now slowly release the pressure on the plunger, so that there is no more suction effect. Shift the fingers to hold the outside of the barrel, well away from the plunger. Withdraw the syringe & needle gently from the skin.

After the needle is withdrawn, syringe is fixed into the plunger and it is pushed so that the contents of the needle are blown gently on to the slides. The cellular preparation on the slides should be thin and even. Cytological smears were prepared, air dried and stained by leishman stain.

Specimens of breast lesions for histopathological examination done (both mastectomy and biopsy samples) whose cytology was available were received in histopathology section.

Detailed gross examination was done and the specimens were fixed in 10% formalin followed by thorough sampling.After fixation representative tissue pieces were taken not more than 4mm. The thick tissue pieces were processed to make paraffin blocks. Then sections were stained with Hematoxylin and Eosin and then microscopic examination was done.

Inclusion criteria

Those cases included whose both cytological smear and histological sections are available.

Exclusion criteria

Inadequate smears and samples.

III. Results

The study based upon the observations made on 300 cases of breast lumps, in Pathology department, GRMC and J.A. Group of Hospitals, Gwalior from January 2018 to June 2019. All the cases were studied by performing FNAC procedure on all the 300 patients and their diagnosis was confirmed by their histopathology examination. All the cases were categorized and analyzed by using different elaborated parameters.

Table 1: Age incidence in 300 cases of breast lumps

S.No.	Cytological diagnosis	Total no. of cases	Age group in years			
			<20	21-40	41-60	>60
1.	Fibroadenoma	176	76	94	6	-
2.	Carcinoma	102	-	12	68	22
3.	Acute/chronic mastitis	8	-	6	2	-
4.	Fibroadenosis	5	1	3	1	-
5.	Fibrocystic disease	3	-	1	2	-
6.	Gynaecomastia	3	-	2	1	-
7.	Cystosarcomaphyllodes	1	-	-	1	-
8.	Simple cyst	1	-	1	-	-
9.	Suspicious malignancy	1	-	-	1	-

Table 1 showing that fibroadenoma was more frequent in the age group of 21-40 years (31.3%), the age group of 41-60years was common for carcinoma (22.6%), acute/chronic mastitis was common in age 21-40years (2%), fibroadenosis was common in age21-40years (1%), fibrocystic disease was common in age 41-60 years (0.6%) respectively.

The case of gynaecomastia in male breast was common in age group 21-40 years (0.6%), single case of cystosarcomaphyllodes was found in 5th decade,a case of simple cyst &Suspicious of malignancy was found in 4th&5th decades respectively.

Table 2 :Cyto-histopathological correlation in 300 breast lumps

Cytological diagnosis	Histopathological diagnosis											
	No. of cases	Benign	Fibroadenosis	Fibrocystic disease	Mastitis	Carcinoma	Cystosarcomaphyllodes	Gynaecomastia	Simple cyst	Suspicious malignancy	Male breast	Total
Benign	176	163	4	2	-	3	-	-	3	01	-	176
Fibrosingadenosis	05	-	03	02	-	-	-	-	-	-	-	05
Fibrocystic disease	03	-	-	03	-	-	-	-	-	-	-	03
Carcinoma	102	-	-	-	-	99	01	02	-	-	-	102
Mastitis	08	-	-	-	08	-	-	-	-	-	-	08
Gynaecomastia	03	-	-	-	-	-	-	-	-	-	03	03
Simple cyst	01	-	-	01	-	-	-	-	-	-	-	01
Cystosarcomaphyllodes	01	-	-	-	-	-	-	01	-	-	-	01
Suspicious malignancy	1	-	-	-	-	-	-	1	-	-	-	1

In this study 176 cases of fibroadenoma were diagnosed on the basis of cytological examination, out of which 163 cases were histologically proved as fibroadenoma whereas 4cases were found to be

fibroadenosis,2cases were found to be fibrocystic disease, 3cases as sclerosing adenosis,1case was tubular adenoma and 3cases were proved as infiltrating ductal cell carcinoma.

102 cases were cytologically diagnosed as carcinoma breast, out of which 99cases were of ductal cell carcinoma, 2cases were of cystosarcomaphyllodes and 1case was of medullary carcinoma, proven histopathologically.

5cases of fibroadenosis were reported on cytology, out of which 3cases histologically proved as fibroadenosis and 2cases as fibrocystic disease, While in fibrocystic disease, Acute/Chronic mastitis, cystosarcomaphyllodes and gynaecomastia, cytohistological correlation was 100%.

There was a case of simple cyst in cytology, which was diagnosed as fibrocystic disease in histopathology and 1case of suspicious malignancy which was proved as cystosarcomaphyllodes (malignant) in histopathology. Along with this single case of cystosarcomaphyllodes (benign) in cytology which on histopathology also confirmed as cystosarcomaphyllodes (benign).

Table 3 : Topographical distribution of 300 cases of breast lumps

Lesions of the breast	No. of cases	Percentage
Upper outer quadrant	126	42.0
Central quadrant	56	18.6
Upper inner quadrant	52	17.3
Lower outer quadrant	38	12.6
Lower inner quadrant	18	6.0
Whole breast	08	2.6
Tail	02	0.6

The most common site for breast lump was found in upper outer quadrant were 126(42.0%) cases, followed by 56(18.6%) cases in central retroareolar region, followed by 52(17.3%) cases in upper inner quadrant.

There were 38(12.6%) cases in lower outer quadrant, 18(6.0%) cases in lower inner quadrant followed by 8(2.6%) cases involved whole breast and there were only 2 (0.6%) cases in axillary tail.

Table 4 :Cytological and histopathological correlations

Cytological diagnosis	No. of cases	Histopathologically diagnosis		
		Consistent	Inconsistent	Total
Benign	177	174(98.3%)	3(1.6%)	177(100%)
Malignant	102	102(100%)	0	102(100%)
Suspicious of malignancy	1	1(100%)	0	1(100%)
Others	20	20(100%)	0	20(100%)
Total	300	297(99%)	3(1%)	300(100%)

The cytological diagnosis were correlated with histopathological diagnosis and consistency calculated.

Statistical analysis

Accuracy of FNAC is described in terms of sensitivity, specificity, efficiency is described for malignant cases as following-

True positive cases: - 103[consistent: 102 malignant + 1case: suspicious of malignancy]

False positive cases: - 00, True negative cases =194 [consistent: 174 benign+20 others]

False negative cases: - 3[inconsistent]

Sensitivity=Sensitivity of FNAC is the ability of a test to identify correctly all those who have the disease.

Sensitivity=[TP/(TP+FN)]x100%=[103/(103+3)]x100%=97.1%

Specificity =It is the ability of the study to identify correctly those candidates who donot have the disease.

Specificity=[TN/(TN+FP)]x100%=[194/(194+00)]x100%=100%

Efficiency=[TP+TN/TP+FP+FN+TN]x100%=103+194/103+00+3+194=99%

IV. Discussion

In this study, 300 cases of breast lumps that also included 3 cases of male breast of different age groups had been studied and their clinico-cytological &cyto- histological correlation were observed.

Cytologically it was observed that fibroadenoma was seen in 176 cases (58.6%) followed by Carcinoma in 102 cases (34.0%), acute / chronic mastitis 8 cases (2.6%), fibrosingadenosis 5 cases (1.6%), Fibrocystic disease 3 cases (1.0%), gynaecomastia 3 cases (1%), Cystosarcomaphyllodes 1 cases (0.3%), Simple cyst 1 case (0.3%) & suspicious of malignancy 1 case (0.3%).

In this study, most common involved breast was left whereas upper outer quadrant was most common site for breast lump which was seen in 126 cases (42.0%) with the least involved quadrant was lower inner quadrant in 18 cases (6.0%).

Similar findings were observed in study done by Rocha PD et al (1997),[8]Gangopadhyay M et al (1997)[12] and Prem Singh et al (2015)[13].

While Zuk JA et al (1989)[14] who reported involvement of upper outer quadrant in 42.2% and least involved quadrant is lower inner(4.3%).

In our study of 300 cases, fibroadenoma (58.6%) was the most frequent finding whereas in study of Sulhyan K R et al (2017) it was 78.9%;[2]Olu –Eddo A N et al (2011) 85.06%[15]andSiddique M S et al (2003) 86.2%[16] and in study of Kavita Sharma et al (2018) 36.4% cases were reported.[17]

Our study included patients in the age group ranging from 10-80 years. Majority of cases were in their reproductive age group. Minimum age of fibroadenoma patient was 14 years and the maximum age was 45 years. Majority of the patient's age was between 14-30 years.

Oluwoleet al[18] and Raju et al[19] also reported that commonest age group was 15-25 years which was almost similar to our study.

While Haque et al (1980)[20] reported most common age group of fibroadenoma to be 30-40 years which was higher when compared to our study.

In our study maximum malignant tumors were in the 5^{th} decade followed by 6^{th} and 4^{th} decade while Mudholkar et al (2012)[21] reported maximum incidence of malignant tumors in 6^{th},5^{th} and 7^{th} decade which are slightly higher as compared to our study.

In our study invasive carcinoma – No special type was the most common malignant neoplasm. In histology, these tumors are firm and are composed of sheets and strands of large cancer cells infiltrating the stroma of the breast.

Kavita Sharma et al (2018)[17] also observed that invasive carcinoma – No special type was the most common malignant tumor, similar to our study.

In our study, 97 cases of invasive breast cancer were graded according to Nottingham modification of Bloom Richardson grading system. This grading system is based on 3 characteristics of tumor: The degree of gland / tubule formation, nuclear pleomorphism and mitotic activity. Grade II 48.8% invasive breast carcinoma was the most common finding in our study.

Kavita Sharma et al (2018)[17] found (46.9%) cases of grade II invasive breast carcinoma which is slightly lower as compared to our study.

Two cases (0.6%) of malignant phyllodes on HPE were found in our study showing large and bizarre malignant cells with frequent mitosis.

Koss et al[22] also observed that phyllodes tumor consist of less than 1% of palpable tumors of breast that is similar as compared to our stud

The percentage of malignancy on cytology was (34%), these findings were slightly higher when compared with Ramesh S waghmare et al (2016)[23] who reported percentage of malignancy in cytology to be 31.50%.

In our study, total 3 cases of fibrocystic disease were observed with age ranging from 24-52 years .

Sulhyan et al (2017)[2] reported total 6 cases of fibrocystic disease in his study with age ranging from 28-55 years which is slightly higher in comparison to our study.

Our study includes 3 cases of gynaecomastia. Age ranges from 21 to 65 years. Gynaecomastia on cytology is easily diagnosed as a subareolar mass and can sometimes cause problem due to inadequate material aspirated and its painful nature. FNAC is indicated to rule out malignancy.[10]

Sulhyan et al (2017)[2] reported incidence of gynaecomastia to be 2.5% which is slightly higher in comparison to our study which showed only 1% .

V. Conclusion

The present study was carried out to establish the utility and diagnostic accuracy of fine needle aspiration cytology in breast lesions and it's correlation with histopathological examination.

Clinically all lumps presented in the age period of 15 to 75 years. The breast lumps included were both malignant and benign lesions such as carcinoma, fibroadenoma, fibrosingadenosis, chronic mastitis, cystosarcomaphyllodes, fibrocystic disease, gynaecomastia, simple cyst.

In the present study, we concluded that neoplastic lesions were more common than non-neoplastic lesions. The benign tumors were most frequent in second, third and fourth decades, while malignant tumors were seen beyond 4^{th} decade.

All the tumors involved upper outer quadrant most frequently.

Fibroadenoma was the most common benign tumor. Invasive breast carcinoma- No special type was the most common malignant tumor.

There are 3 false negative cases(1.6%) in malignant group only. No false positive case was reported in the present study.

FNAC is an effective modality for the diagnosis of breast lesions. It is a simple, safe and cost-effective outpatient procedure associated with negligible complications. It helps the clinicians for early diagnosis and specific management thus reducing morbidity and mortality.

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